THE NATIONAL AGRICULTURAL RESEARCH SYSTEM OF IRAQ[1]

1. HISTORICAL BACKGROUND

In the 1920s, a Directorate General of Agriculture, affiliated to the Ministry of Economics and Transport, started agricultural research (AR) activities and established the first experimental stations at Abu Ghraib and Neinevah, and the Central Veterinary Laboratory, which focused its work on the diagnosis and control of pests and animal diseases.

In the 1940s, AR activities were covered by the Directorate General for Agricultural Research and Extension (DGARE) of the Ministry of Agriculture (MOA), with its headquarters at Abu Ghraib. They were further strengthened upon the establishment of the College of Agriculture (created in 1952 by MOA) and the College of Veterinary Medicine (1956), affiliated to the University of Baghdad.

In 1958, the Directorate General for Agricultural Research and Projects (DGAREJ) was established as the only body responsible for AR within MOA, except for the research on forestry assigned to the State Board of Forestry. In 1968, DGAREJ was terminated and AR came under the responsibility of four directorates concerned with agronomy, horticulture, animal resources, and plant protection and agricultural extension. During the 1970s, research activities were expanded as MOA established several specialized research stations and centers in different parts of the country.

This period also witnessed the establishment of the College of Agriculture and the College of Veterinary Medicine at Mosul University in 1964 and 1968, respectively, the College of Agriculture of Basrah in 1973, and the Iraqi Atomic Energy Commission (IAEC) in 1967, endowed with an Agricultural and Biological Research Center (later restructured into four specialized centers).

In 1980, MOA established the State Board for Applied Agricultural Research (SBAAR) to be responsible for all its AR activities. With the merging of MOA and the Ministry of Irrigation (MOI) in 1987, SBAAR integrated the Center for Water and Soil Resources (CWSR) and was renamed as the State Board for Agricultural Research and Water Resources (SBARWS). In 1990, SBARWS was terminated and replaced by the State Board for Agricultural Research (SBAR) and CWSR. When MOA and MOI separated again in 1993, SBAR remained within MOA and CWSR went to MOI.

Two Colleges of Agriculture were founded at Tikrit and Anbar in 1993 and 1994, respectively, and one College of Veterinary Medicine at Qadisia University in 1994.

2. THE CURRENT NARS

2.1 **Overview** (see Table 1)

The Iraqi NARS is currently (1997) made up of three main categories of institutions:

- The institutions specialized mainly in AR: the State Board for Agricultural Research (SBAR), affiliated to MOA, and the Center for Water and Soil Research (CWSR) of the Ministry of Irrigation, which account together for 32% of the potential research years (pRYs: equivalent full-time researchers) of the NARS[2]; they are presented in Section 2.2.
- Five colleges of agriculture and three colleges of veterinary medicine supervised by the Ministry of Higher Education and Scientific Research (MHESR), which gather 49% of the pRYs of the NARS (see Section 2.3).
- Other scientific and technical institutions for which AR is a secondary mandate (mainly the four AR-related centers of the Iraqi Atomic Energy Commission), which account for 19% of the pRYs (see Section 2.4).

Officially, MOA has the responsibility of the national AR policy, but in practice it shares it with other institutions and ministries involved in AR activities.

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[2] Table 1 do not provide any data on the financial resources of the NARS, which are usually considered major information or criteria for assessing the relative importance of the NARS institutions and their actual capacity for mobilizing their human and physical resources.

2.2 The AR Institutions

The State Board for Agricultural Research (SBAR)

Mandate and Organization

SBAR is the largest NARS institution: it represents 26% of the potential RYs (pRYs)[1] of the NARS. Its main mandate is AR which mobilizes about 75% of the time of its professional staff. Other activities cover community services (soil analysis, seed production, etc.), extension and training.

At present, SBAR consists of six main agricultural divisions: agronomy, horticulture and forestry, date palms and tissue culture, soils, animal resources, and plant protection.

Human, Physical and Financial Resources

SBAR currently (1997) has 638 national permanent full-time staff, of whom 266 are professional graduate staff who represent around 200 pRYs. The academic level of the graduate staff is rather low (37 PhD, 54 MS, and 175 BS holders); this situation is the consequence of the salaries offered up to the end of 1995 by SBAR (and the MOA institutions), which were considerably lower than those paid to the university staff members. SBAR could not attract highly qualified researchers, and many researchers found their way to the universities; however, in 1995, salaries were increased in the range of 100200%.

Technicians are not sufficient either in number or quality, because of low salaries offered and budget restrictions.

SBAR has 14 research stations which cover key agroecological zones (in irrigated and rainfed areas). Infrastructure and equipment (offices; labs; libraries; scientific, computer, transport and communication facilities), which were considered fair 10 years ago, are now suffering from lack of maintenance, replacement or modernization. The problem of spare parts replacement is very acute.

Financial resources are funded mostly by the country (essentially by the Government, with some self-earned income coming from sales of services/products and from research contracts funded by national development organizations). External grants are very few (see Section 4.2). Operational and capital costs, which may represent 35% of the available resources, are far from covering the needs, and the SBAR scientific potential is much underemployed.

Research Activities and Linkages

Research activities include both crop and animal production. Within crop production, priority is given to cereals (wheat, rice, barley, corn) as they represent the main crops for human consumption under the present circumstances and the sanctions imposed on Iraq. Attention is also given to industrial crops (cotton, sunflower) and horticultural crops. Research is also conducted on forestry, fisheries, agricultural economics, agricultural machinery, etc.

A new research policy has been adopted so as to improve relationships with development organizations (see Section 4.1). An executive committee was recently founded to periodically review research accomplishments and obstacles.

SBAR cooperates with CWSR through joint teams whenever necessary. Likewise, there is continuous cooperation between SBAR and the universities; its staff may deliver some lectures or take part in joint research programs. International scientific cooperation is very limited (see Section 4.2).

The Center for Water and Soil Research (CWSR)

This Center employs a total of 58 professional graduate staff members (9 PhD, 9 MS, 40 BS). It has faced the same comparatively low salaries as SBAR. Numbers of technicians and other support staff are very insufficient.

erosion and sediment transportation, use of saline water in irrigation and land reclamation, efficiency of irrigation systems, drainage performance, water pollution, soil survey, and soil management.

2.3 The Colleges of Agriculture and Veterinary Medicine

Overview

The five colleges of agriculture and three colleges of veterinary medicine are supervised by their respective universities which are autonomous public institutions (each governed by a council of deans) supervised by the Ministry of Higher Education and Scientific Research (MHESR). These are:

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- the College of Agriculture (CA), Baghdad University: It is the oldest CA, considered as the mother college of all agricultural institutes in Iraq, and the largest one, with 507 academic staff members (asm), including 188 PhD and 150 MS holders;
- the College of Agriculture and Forestry, Mosul University (267 asm, 107 PhD and 124 MS holders);
- the CAs of Basrah University (189 asm, 44 PhD and 79 MS holders), Tikrit University (51 asm, 18 PhD and 19 MS holders), and Anbar University (46 asm, 11 PhD and 23 MS holders); and
- the College of Veterinary Medicine (CVM), Baghdad University, the oldest and largest CVM (293 asm, 91 PhD and 104 MS holders); and the CVMs of Mosul University (127 asm, 31 PhD and 54 MS holders) and Qadisia University (30 asm, 3 PhD and 12 MS holders).

The eight colleges employ a total of 1510 academic staff members (including 493 PhD, 467 MS and 550 BS holders). Their main mandate is teaching: all colleges grant BS degrees, while those of Baghdad, Mosul, and Basrah grant MS and PhD degrees as well. There are about 11,000 students enrolled in the eight colleges, which means a reasonable number of students per academic staff member (an average of 7.3). Other mandates cover research (see below) and extension, but the time and effort spent by university staff on extension is rather limited. Some coordination exists among the CAs and CVMs through quarterly meetings of their deans.

Research Activities

The CAs were founded in different regions of the country so as to solve the agricultural problems that may exist in these regions. For example, CA/Baghdad is mainly concerned with irrigated areas and horticulture; CAF/Mosul (northern part of Iraq) with cereal production in rainfed areas, forestry and wood technology; CA/Tikrit with gypseous soil cultivation; and CA/Basrah with date palm research, horticulture and fisheries. All CAs and CVMs are concerned with animal husbandry.

The CAs and CVMs have high comparative advantages for AR activities: they enjoy a very large number of qualified academic staff in all disciplines and fields; they are able to mobilize for research strong graduate study programs (243 and 296 students enrolled at the PhD and MS levels).

However, AR is constrained by several factors:

- Most of the support resources (technicians, buildings, labs, farms) are devoted to education; specific research resources are very limited (few technicians, inadequate labs and scientific equipment, few vehicles, poor libraries, low and unstable funds).
- The CAs and CVMs lack coherent research policies and research management systems.
- Relations with national AR institutes and with farmers and extension workers are limited. Due to the sanctions imposed on Iraq, contacts and communication with the outside world are very limited.

These factors have badly affected research activities. According to CA and CVM officials, academic staff members may allocate 20-25% of their time for research and research-linked activities, which would represent about 380 potential RYs. This ratio has been actually much lower during the last years, and probably does not currently exceed *10*%, which would represent only around 150 actual RYs for the eight colleges. However, since the adoption of the national strategy for agricultural research and transfer of technology in 1995 (see Section 4.1), the situation has slightly improved. Academic staff members of the colleges are becoming active participants in all the national development programs (cereals and legumes, cotton, corn, tomato, and rice) supervised by MOA. These activities strengthen university contacts with farmers and extension workers through research output that is formulated in extension material in collaboration with the MOA Directorate General of Agricultural Extension.

2.4 The Other Scientific and Technical Institutions of the NARS

The Other Scientific Institutions of the NARS

They include the Iraqi Atomic Energy Commission and other units affiliated to universities.

The Iraqi Atomic Energy Commission (IAEC) - IAEC currently has four AR-related centers created recently from dividing its previous Agricultural and Biological Research Center; they are the Agricultural Research Center, the Fisheries Research Center, the Seed Technology Center, and the Biotechnology Center. These Centers may account for about a quarter of the IAEC total professional staff members (392, including 43 PhD, 84 MS, 265 BS holders), which gives around 100 researchers working full-time on agronomy, horticulture, livestock, fisheries, natural resources, seed technology, biotechnology and other different cross-sectoral fields.

University Units Specialized in Agriculture-Related Sciences - Apart from the agricultural colleges presented above, most universities have units specialized in agriculture-related sciences, such as breeding, pathology, entomology and microbiology in departments of plant/animal biology; soil and water in some faculties of sciences; food technology and agricultural mechanization in faculties of engineering; rural socioeconomics in faculties of economics; etc., with highly qualified academic staff members. Some universities or faculties have set up training/research departments or units to boost research in these domains; for example, the Department of Biotechnology and Genetic Engineering, Baghdad University[1], and the Center of Environment Beach Research, Mustanserieh University[2]. The agricultural divisions of the Polytechnic Institutes[3] also fall in this category of institutions.

No precise inventory of this scientific potential has been made recently; however, according to the partial information available
the agricultural colleges, these scientists may represent about 50 potential RYs or 20 actual RYs.

The Other NARS Technical Institutions

Some administrative units and public enterprises are or have been directly involved in AR through research development units (stations, labs) or informal permanent or temporary research activities, such as the General Directorate of Irrigation Projects and Land Reclamation, Baghdad[4], and the General Organization for Food Industries (headquarters in Baghdad), mentioned in the 1991 ISESCO inventory on the Islamic research centers. No clear data is available on this category of institutions, their AR activities and resources; therefore, they are not included in the synthesis Table 1.

3. AR RESOURCES

3.1 Human Resources

The Iraqi NARS currently involves more than 2,100 scientific and technical graduate staff, all nationals, who represent 770 pRYs. The academic staff members of the agricultural colleges constitute the bulk of this potential, with a high academic level (33% are PhD holders). SBAR and CWSR researchers are much less in number and have a much lower academic level (only 14% are PhD holders).

In general, the number and quality of technicians and other support staff are insufficient and may represent a strong

3.2 Financial and Physical Resources

Funding of research activities is mainly secured through government allocation for both public institutions and universities. Marginal funds come from self-earned sources such as research contracts with development organizations, consultancies to the private sector, and sales of agricultural production (seed, market production).

Under sanction conditions, a high proportion of the available funds is allocated to salaries in all NARS institutions. In other words, very limited resources are available for operational and capital expenses. It is also impossible to purchase foreign equipment (scientific facilities, vehicles, etc.), books, journal subscriptions, etc., and current international cooperation is too limited for compensating this gap.

Accordingly, the NARS physical resources are deteriorating, and the large human scientific potential built in the 1980s is currently very underemployed: the NARS has (rough estimate) only about 200 to 250 actual RYs (including about 100 to 150 aRYs for the AR institutes, 40 for the colleges, and 60 for the other institutions) against the 770 potential RYs mentioned above.

[1] This unit (formerly a research center called the Biological Scientific Research Center) has 31 scientists (including 10 PhD, 13 MS) involved in education at the graduate level (MS and PhD) and research in biotechnology, gene transfer, cloning and molecular biology genetics, applied mainly to agriculture (other areas are involved, such as pharmacy and medicine).

[2] This Center, established in 1995, has 8 scientists (3 PhD, 5 MS, with backgrounds in agriculture, biology, engineering) working on a part-time basis in research (activities just starting) and in consultancies to the Ministries of Health and Irrigation on environmental issues.

[3] Three Polytechnic Institutes (with 349 academic staff members, including 43 PhD and 84 MS holders) have agricultural divisions which grant an agricultural diploma after 2 years of academic orientation and training.

[4] This unit, formerly named the Organization for Land Reclamation (153 professional staff, including 1 PhD and 1 MS), now affiliated to MOI (with possible transfer to MOA in the near future), has a Department of Western Desert and Desertification Control which may have some research activities.

4. RESEARCH ACTIVITIES

4.1 Research Policy and Orientation

The national strategy for agricultural research and transfer of technology, adopted in 1995, aims to support the agricultural policy which focuses on achieving: (i) food self-sufficiency through (mainly) adoption of new, more productive technologies; (ii) sustainability of agricultural production on the long-run by insuring sound management and development of available agricultural resources, especially land and water; and (iii) social and economic equity between the agricultural sector and other sectors of the economy, and within the agricultural sector itself. This strategy is an important achievement for the NARS, especially for SBAR and IAEC. According to the strategy:

- Research programs should be mainly applied and/or adaptive in nature. They should (i) be multidisciplinary in their approach and represent a continuum starting from the generation of technologies through on-farm trials and demonstrations and the transfer of results to potential users; (ii) include socioeconomic components to ensure the economic soundness and acceptance of research outputs and recommendations by the potential users; and (iii) be oriented towards developing and adopting technologies, management practices and policies which address the problems and needs of the agricultural sector. Research programs should give emphasis to the production system dimension consisting of four major thrusts: irrigated agriculture, rainfed agriculture (above 450 mm), low rainfed areas, and integrated livestock. The production systems are considered the umbrella under which the traditional commodity and non-commodity research programs operate.
- The strategy mandates all NARS institutions with applied research and transfer of technology activities, and with the responsibility of coordinating and supporting national AR programs so that they can help in identification, testing, transfer and adoption of technical management and policy information contributing to the objectives of the national agricultural policy. Such mandates may have beneficial impact on research planning, priority setting and management of research programs, and will help the scientists to conduct their research on the farm level and to be in direct contact with the farmer.
- The strategy defines roles of the various institutions in order to achieve stronger interrelationships and complementarity among them, which is the only proper way to address national issues under the constraints of limited financial and human resources due to the sanctions imposed on Iraq.

4.2 National and International Linkages

Until recently, linkages between the NARS institutions and the different ministries concerned with AR were weak and consisted mainly of formal means, such as memberships in research councils and the participation of SBAR and IAEC members in committees of different research programs at the universities and vice versa. But there was a substantial gap in the working linkages: research activities were undertaken by each institution without consultation with the others working in similar areas, this resulted in duplication of efforts and waste of time and resources. Linkages of the NARS institutions with extension/development organizations and with farmers were also insufficient.

These linkages have improved with the implementation of the national strategy for agricultural research and transfer of technology. Collaboration between SBAR and the colleges of agriculture is becoming stronger through the participation of university staff in conducting joint research activities and through the holding of joint field days, seminars, and writing of joint publications. Relations with extension/development organizations and with farmers have grown through the national development programs. The researchers in general (and to a much lesser extent the academic staff members of the colleges) have also become extension workers through conducting adaptive research with the farmers on the farms and transferring their research results to the farmers.

Due to the sanction conditions, the Iraqi NARS has limited scientific international relations. The major current partners are ICARDA, ACSAD and FAO. Collaboration with ICARDA focuses on cereals, grain legumes, support services (documentation, computers), and multidisciplinary research development programs (Mashreq/Maghreb Project, funded by IFAD) with a technology transfer dimension on line with the national strategy.

5. CONCLUSION

The Iraqi NARS is made up of two main categories of institutions which have opposite features: the AR institutes linked to the Ministries of Agriculture and Irrigation, and the agricultural colleges. In the AR institutes, the graduate research staff members have a relatively low academic level and are few in comparison with the large number of research activities to be carried out, but they enjoy the largest research facilities. The colleges have a large number of well-qualified academic staff, with limited research physical resources. For a long time, these two groups have maintained limited research collaboration and could not take advantage of their complementarity, which has led to a

rather large waste of the national resources involved in AR.

The sanctions imposed on Iraq in 1990 have worsened this situation: with low financial resources and no access to foreign goods, all the NARS institutions have been suffering from an increasing underemployment and erosion of their scientific potential as well as a deterioration of their physical facilities.

However, the high priority given to agricultural development and the national strategy for agricultural research and transfer of technology adopted in 1995 offer better perspectives for AR in the country, which should allow reinforcement of SBAR and CWSR, larger research involvement of the colleges, improved relations between these scientific institutions, and efficient linkages with development organizations.

Main Acronyms

MOA: Ministry of Agriculture. **MOI**: Ministry of Irrigation. **MHESR**: Ministry of Higher Education and Scientific Research.

SBAR: State Board for Agricultural Research. **CWSR**: Center for Water and Soil Research. **CA**: College of Agriculture. **CVM**: College of Veterinary Medicine.

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Table 1 - The National Agricultural Research System (1996/97)*

Italics: Approximate data. *: See footnotes.

NARS Institutions					AR Scientific & Technical Graduate Staff * (Units)		Potential Res. Years*
No.	**Name** - Acronym Head Office - Year Established		**Mandates** **AR Fields**	**Govern. Minist.**	Total	(PhD , MS)	
a	b		c	d	e	f	g
1.1	State Board for Agricultural Research, Baghdad	SBAR - 1972-80	AR (75%) - All (exc. an. health, fish)	MOA	266	37 , 54	200
2.1	Center of Water and Soil Research, Baghdad	CWSR -1980-93	AR (75%) - (AD) - Water, soil	MOI	58	9 , 9	44
1-2	**Total Agricultural Research Institutes**				**324**	**46 , 63**	**244**
3.1	College of Agriculture, Anbar Univ.	CA/A - 1994	AHE - (AR) - All	MHESR	46	11 , 23	12
3.2	College of Agriculture, Baghdad Univ.	CA/Bag - 1952	AHE - (AR) - All	MHESR	507	188 , 150	127
3.3	College of Agriculture, Basrah Univ.	CA/Bas - 1973	AHE - (AR) - All	MHESR	189	44 , 79	47
3.4	College of Agriculture, Tikrit Univ.	CA/T - 1993	AHE - (AR) - All	MHESR	51	18 , 19	13
3.5	College of Agriculture & Forestry, Mosul Univ.	CA/M - 1964	AHE - (AR) - All	MHESR	267	107 , 124	67
3.6	College of Veterinary Medicine, Baghdad Univ.	CV/Bag - 1956	AHE - (AR) - Anim. prod./health	MHESR	293	91 , 104	73
3.7	College of Veterinary Medicine, Mosul Univ.	CV/M - 1968	AHE - (AR) - Anim. prod./health	MHESR	127	31 , 54	32
3.8	College of Veterinary Medicine, Qadisia Univ.	CV/Q - 1994	AHE - (AR) - Anim. prod./health	MHESR	30	3 , 12	8
3	**Total Ag. Sciences Colleges**				**1510**	**493 , 467**	**376**
4.1	Ag. & Biol. Res. Centers, Iraqi Atomic EC, Baghdad	1967	AR (*100*%: Ag. biology)	IAEC	*100*	*12 , 25*	*100*
4.2	AR-related university units (see monograph)		AHE - (AR)	MHESR	*200*	*70 , 60*	*50*
4	**Total Other Scientific Institutions**				*300*	*82 , 85*	***150***
5	**Total NARS**				***2134***	***621 , 615***	***770***
Exchange Rate: 1 Iraqi Dinar = US$ 3.13 (1996 official average rate)					**Actual Research Years** (aRYs) (Estimate) -->		***200250***

MOA: Ministry of Agriculture. **MOI**: Min. of Irrigation. **MHESR**: Min. of Higher Education and Scientific Research. **IAEC**: Iraqi Atomic Energy Commission.

c: **Mandates**: **AR** (.. %): Approximate average % of human resources devoted to ag. research (AR); **R**: Research; **AHE**: Ag. higher education; **AD**: Ag. development/services (for AR and AHE institutes: seed production, soil and water analysis, extension, studies, etc.). **g**: Potential research year (pRY) = equivalent full-time researcher; for the FASs, the pRYs have been estimated multiplying the number of academic staff by 0.25.

* **Notes**: All the graduate staff members and RYs are national. Data on budget and AR expenditures are not available.